

WHAT IS CLAIMED IS:

1. An electronic control system for controlling the position of a vehicle door via control of an electric motor mechanically coupled to said vehicle door, said system comprising:

a position detector mechanically coupled to said vehicle door for detecting at least one of a position and a velocity of said vehicle door;

an abnormality detector electrically coupled to said position detector for detecting a deviation between said at least one of said position and said velocity of said vehicle door and at least one of a commanded position and a commanded velocity of said vehicle door, whereby an abnormal operation of said vehicle door is detected; and

a control circuit electrically coupled to said abnormality detector and further electrically coupled to said electric motor for controlling operation of said electric motor and ceasing operation of said electric motor in response to said abnormality detector detecting said abnormal operation, said control circuit including a timer circuit for determining when a predetermined time period after said control circuit ceases operation of said electric motor, and wherein said control circuit resumes operation of said electric motor in response to both an expiration of said predetermined time period and said

abnormality detector indicating that said abnormal operation has ceased.

2. The electronic control system of Claim 1, wherein said control circuit further comprises a counter for counting a number of times said control circuit resumes operation of said electric motor, and wherein said control circuit further ceases resuming operation of said electric motor in response to said a count of said counter reaching a predetermined value.

3. The electronic control system of Claim 2, wherein said vehicle door is further coupled to a locking device for locking said vehicle door at one or more predetermined positions, and further comprising a locked state detector electrically coupled to said control circuit for detecting that said vehicle door is locked at a first one of said predetermined positions, wherein while said counter has not reached said predetermined value, said control circuit stores an indication that said vehicle door is locked at said first one of said predetermined positions in response to said abnormality detector indicating that said vehicle door is operating normally and said control circuit calculates a difference between a second locked position detected by said locked state detector and said stored

indication and ceases operation of said electric motor if a magnitude of said difference exceeds a predetermined range.

4. The electronic control system of Claim 1, wherein said vehicle door is further coupled to a locking device for locking said vehicle door at one or more predetermined positions, and further comprising a locked state detector electrically coupled to said control circuit for detecting that said vehicle door is locked at a first one of said predetermined positions, wherein said control circuit stores an indication that said vehicle door is locked at said first one of said predetermined positions in response to said abnormality detector indicating that said vehicle door is operating normally, and wherein said control circuit calculates a difference between a second locked position detected by said locked state detector and said stored indication and ceases operation of said electric motor if a magnitude of said difference exceeds a predetermined range.

5. The electronic control system of Claim 1, wherein said position detector detects only a position of said vehicle door.

6. The electronic control system of Claim 1, wherein said position detector detects only a velocity of said vehicle door.

7. The electronic control system of Claim 1, wherein said position detector detects both a position and a velocity of said vehicle door.

8. The electronic control system of Claim 1, wherein said position detector is mechanically connected to said motor, whereby said at least one of said position and said velocity of said vehicle door is detected by said position detector by relating a motor position of said motor to said position of said vehicle door.

9. An electronic control system for controlling the position of a vehicle door via control of an electric motor mechanically coupled to said vehicle door, said system comprising:

means for detecting at least one of a position and a velocity of said vehicle door;

means for determining a difference between said at least one of said position and said velocity of said vehicle door and at least one of a commanded position and a commanded velocity of said vehicle door, whereby an abnormal operation of said vehicle door is detected; and

control means electrically coupled to said detecting means and said determining means and further electrically coupled to said electric motor for controlling operation of said electric

motor and ceasing operation of said electric motor in response to said determining means determining said abnormal operation, said control means further including means for determining when a predetermined time period after said control circuit ceases operation of said electric motor, and wherein said control circuit resumes operation of said electric motor in response to both an expiration of said predetermined time period and said determining means determining that said abnormal operation has ceased.

10. The electronic control system of Claim 9, wherein said control means further comprises means for counting a number of times said control means resumes operation of said electric motor, and wherein said control means further ceases resuming operation of said electric motor in response to said number of times reaching a predetermined value.

11. The electronic control system of Claim 10, wherein said vehicle door is further coupled to a locking device for locking said vehicle door at one or more predetermined positions, and further comprising a locked state detector electrically coupled to said control means for detecting that said vehicle door is locked at a first one of said predetermined positions, wherein

while said number of times has not reached said predetermined value, said control means further stores an indication that said vehicle door is locked at said first one of said predetermined positions in response to said determining means indicating that said vehicle door is operating normally and said control means calculates a difference between a second locked position detected by said locked state detector and said stored indication and ceases operation of said electric motor if a magnitude of said difference exceeds a predetermined range.

12. The electronic control system of Claim 9, wherein said vehicle door is further coupled to a locking device for locking said vehicle door at one or more predetermined positions, and further comprising a locked state detector electrically coupled to said control means for detecting that said vehicle door is locked at a first one of said predetermined positions, wherein while said number of times has not reached said predetermined value, said control means further stores an indication that said vehicle door is locked at said first one of said predetermined positions in response to said determining means indicating that said vehicle door is operating normally and said control means calculates a difference between a second locked position detected by said locked state detector and said stored

indication and ceases operation of said electric motor if a magnitude of said difference exceeds a predetermined range.

13. A method for controlling the position of a vehicle door via control of an electric motor mechanically coupled to said vehicle door, said method comprising:

detecting at least one of a position and a velocity of said vehicle door;

first determining a difference between said at least one of said position and said velocity of said vehicle door and at least one of a commanded position and a commanded velocity of said vehicle door, whereby an abnormal operation of said vehicle door is detected; and

ceasing operation of said electric motor in response to determining said abnormal operation;

second determining when a predetermined time period after performing said ceasing has elapsed;

third determining whether or not said abnormal operation has ceased; and

resuming operation of said electric motor in response to said second determining that said predetermined time period has elapsed and third determining that said abnormal operation has ceased.

14. The method of Claim 13, further comprising repeating said steps of detecting, first determining, ceasing, second determining, third determining and resuming.

15. The method of Claim 14, further comprising:

counting a number of times said step of resuming is repeated; and

ceasing said repeating in response to said number of times reaching a predetermined value.

16. The method of Claim 15, further comprising:

first locking said vehicle door at a first predetermined locking position;

detecting that said vehicle door is locked at said first predetermined locking position;

in response to said number of times not reaching said predetermined value, storing an indication that said vehicle door is locked at said first predetermined locking position;

second locking said vehicle door at a second predetermined locking position;

calculating a difference between a first vehicle door position corresponding to said stored indication and said second predetermined locking position; and



performing said ceasing further in response to a magnitude of said calculated difference exceeding a predetermined range.

17. The method of Claim 13, further comprising:

first locking said vehicle door at a first predetermined locking position;

detecting that said vehicle door is locked at said first predetermined locking position;

in response to said number of times not reaching said predetermined value, storing an indication that said vehicle door is locked at said first predetermined locking position;

second locking said vehicle door at a second predetermined locking position;

calculating a difference between a first vehicle door position corresponding to said stored indication and said second predetermined locking position; and

performing said ceasing further in response to a magnitude of said calculated difference exceeding a predetermined range.

18. The method of Claim 13, wherein said detecting detects only a position of said vehicle door and said first determining determines said abnormal operation only in conformity with a difference between said position of said vehicle door and said commanded position of said vehicle door.

19. The method of Claim 13, wherein said detecting detects only a velocity of said vehicle door and said first determining determines said abnormal operation only in conformity with a difference between said velocity of said vehicle door and said commanded velocity of said vehicle door.

20. The method of Claim 13, wherein said detecting detects both a position and a velocity of said vehicle door and said first determining determines said abnormal operation in conformity with a difference between said position of said vehicle door and said commanded position of said vehicle door and further in conformity with a difference between said velocity of said vehicle door and said commanded velocity of said vehicle door.